

# Hadronic Calorimeter Prototype2 Simulation Update

M. Sarsour  
(GSU)

February 16, 2016

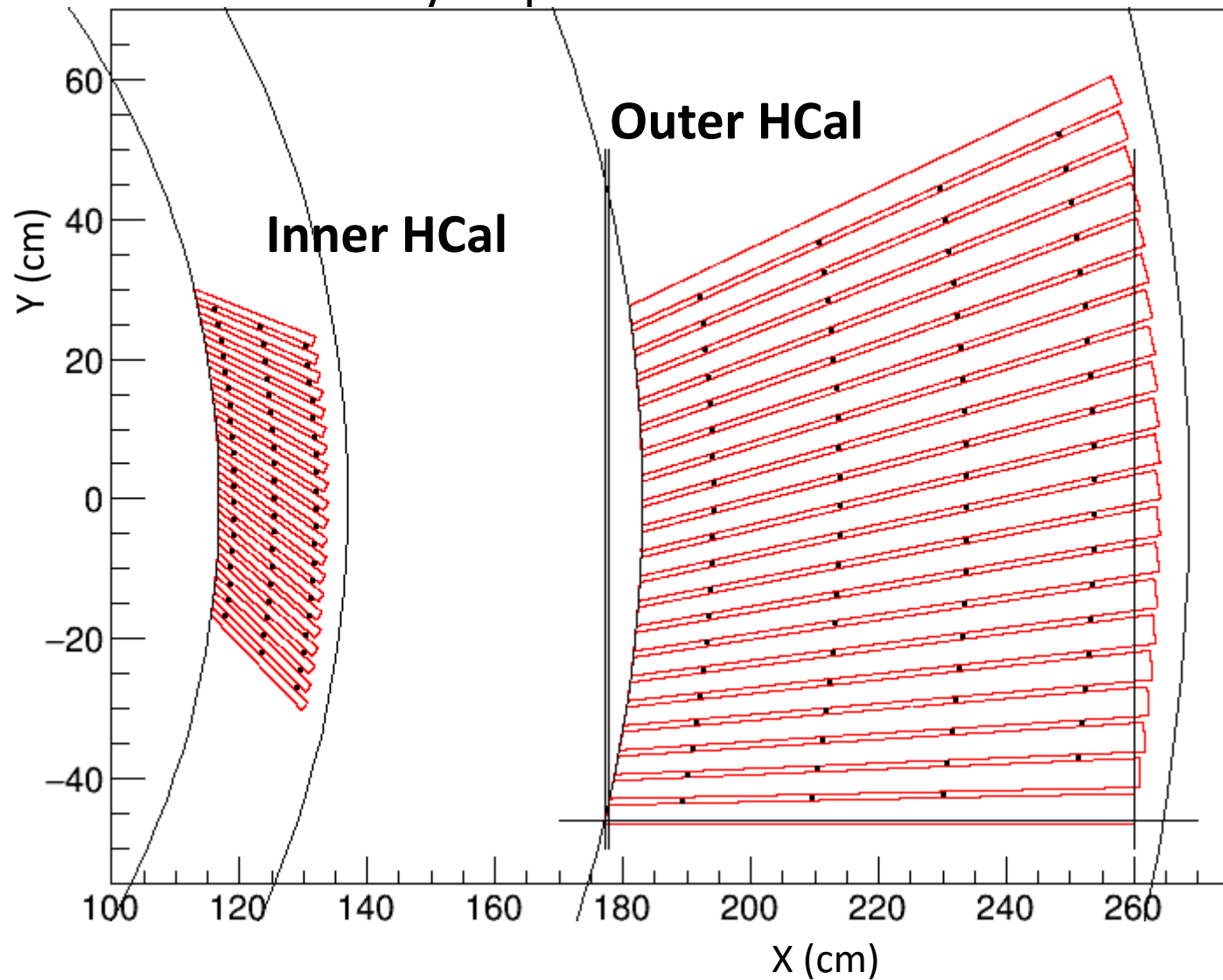
Technical drawing of a ship's hull section, showing two different design proposals for the bottom structure. The drawing includes various dimensions in meters and feet, such as 69.40 [1762.0], 55.02 [1417.0], and 102.41 [2601.2]. It also shows angles like 1.125° and 23.8°. A red box highlights a specific area with the text "Difference that cause asymmetry!". Handwritten green text "sent by Jin" and "sent by Chris" are visible, indicating different design inputs. The drawing shows a cross-section of the hull with internal stiffeners and a curved bottom structure.

sent by Chris

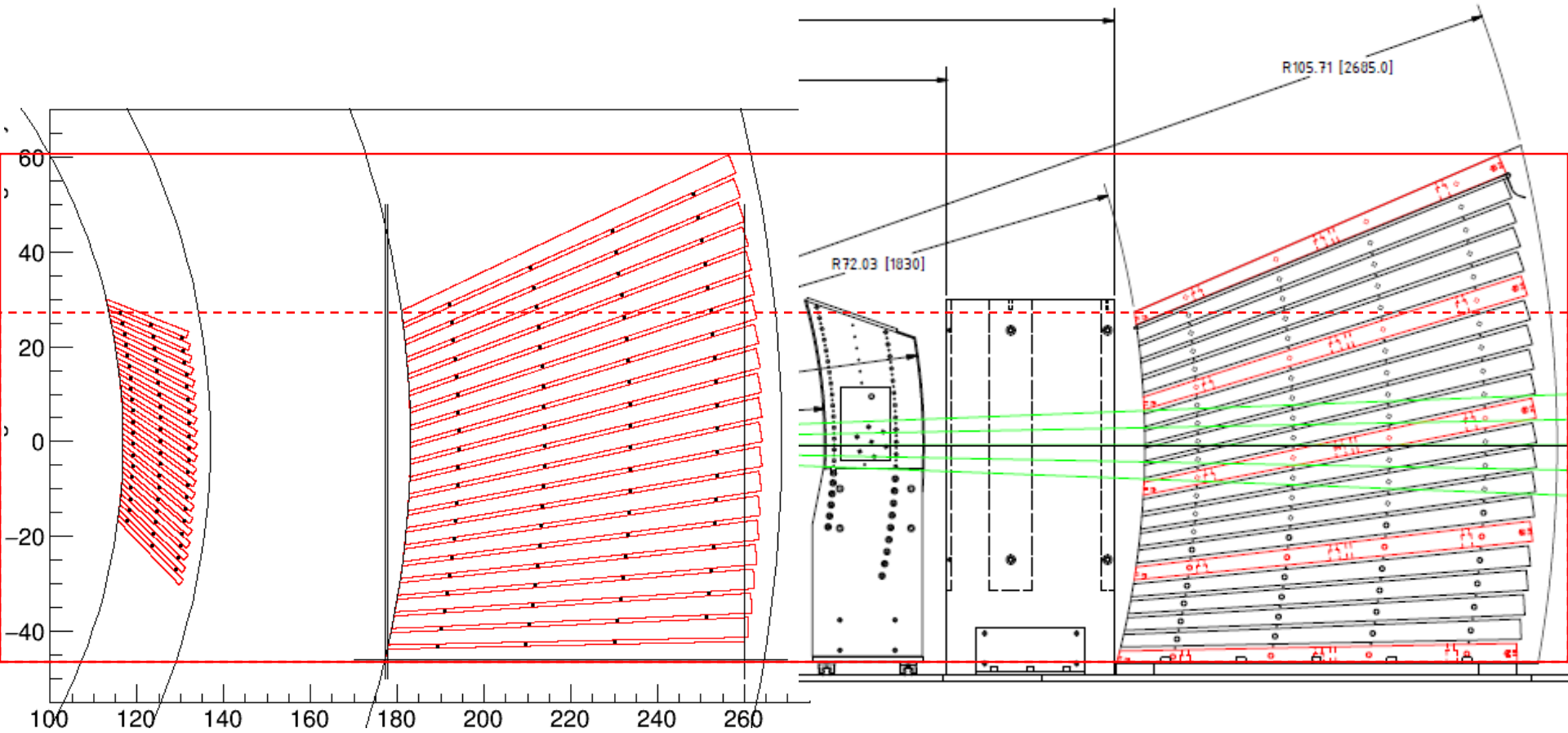
Difference that cause asymmetry!

# GEANT4 Simulations

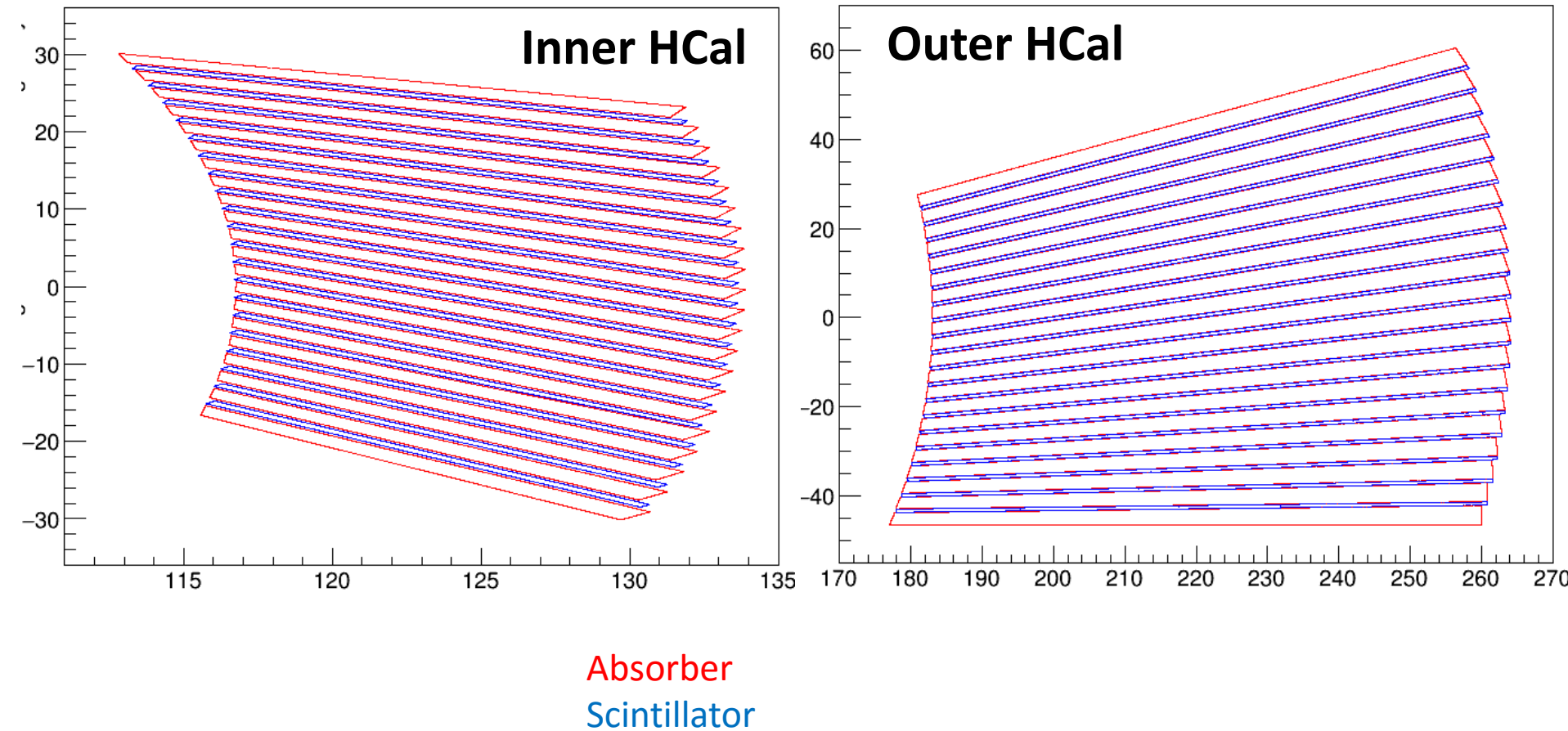
- Richie's  $y\%x$  points



# GEANT4 Simulations

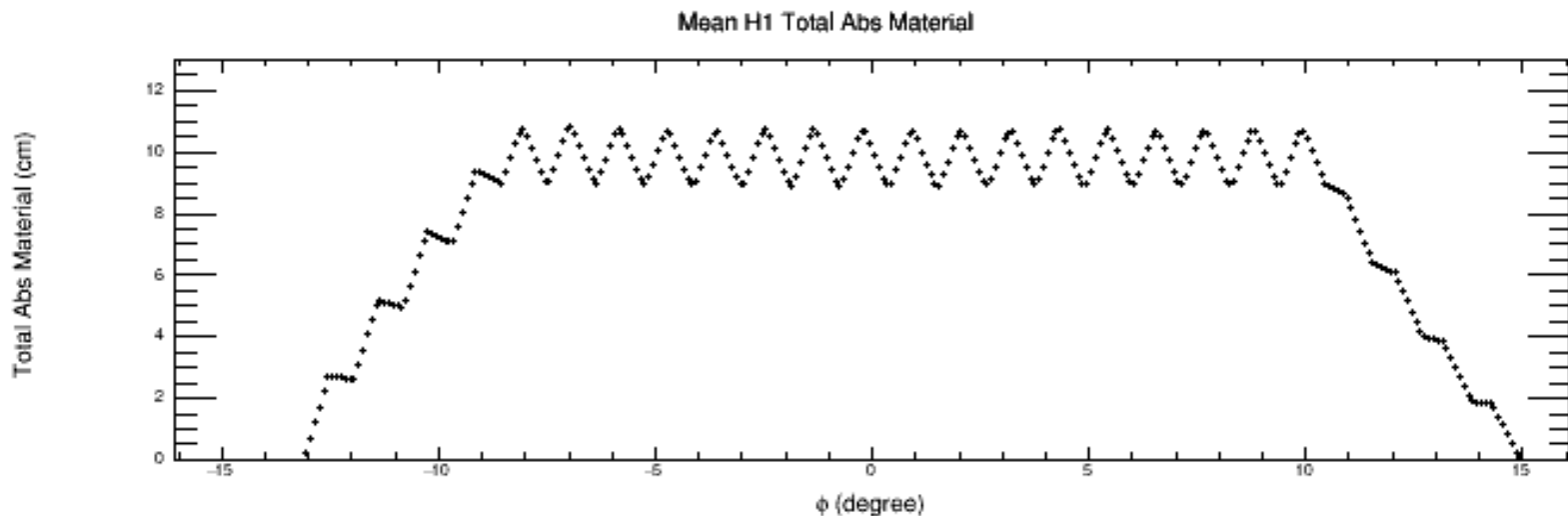
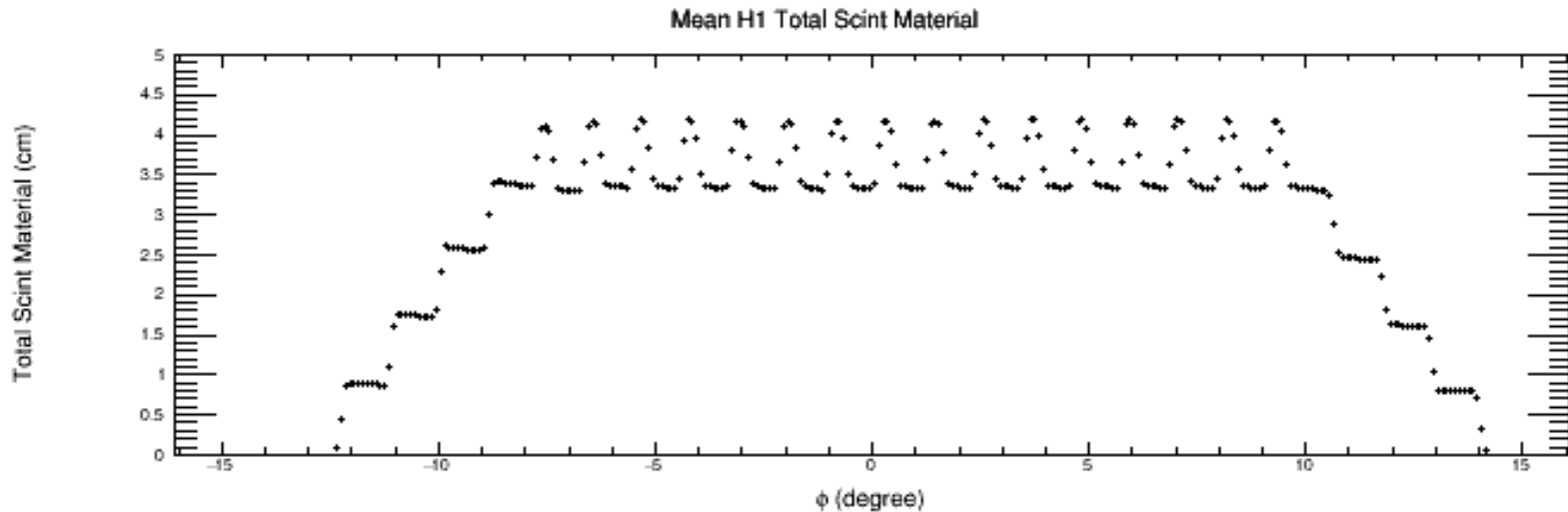


# GEANT4 Simulations



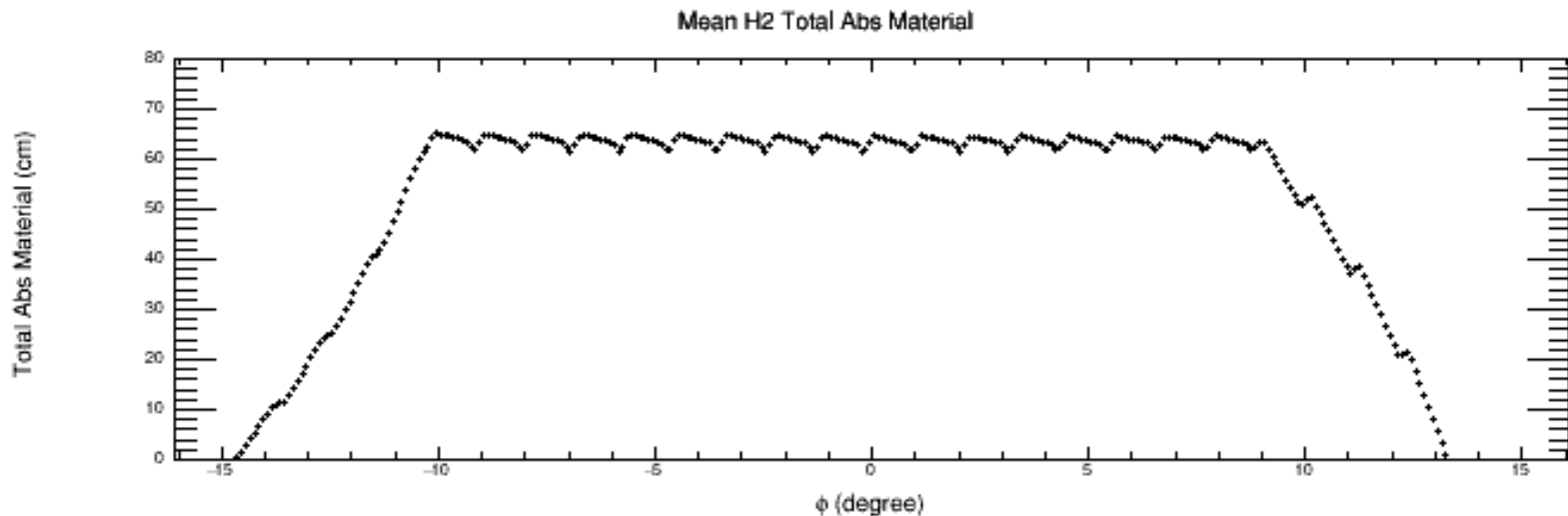
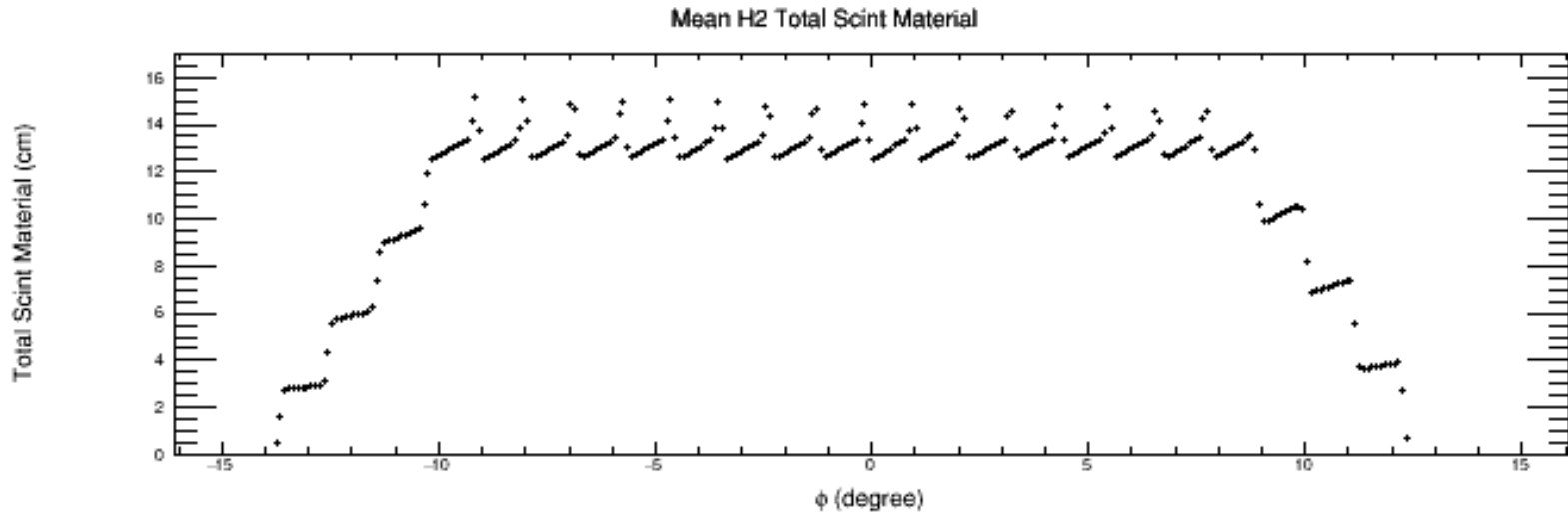
# Material Scan w/ GEANTINOS / Inner HCal

- Beam spot:  $|\phi| < 0.5^\circ$ . Centered at  $-5^\circ$ ,  $0^\circ$ , and  $5^\circ$



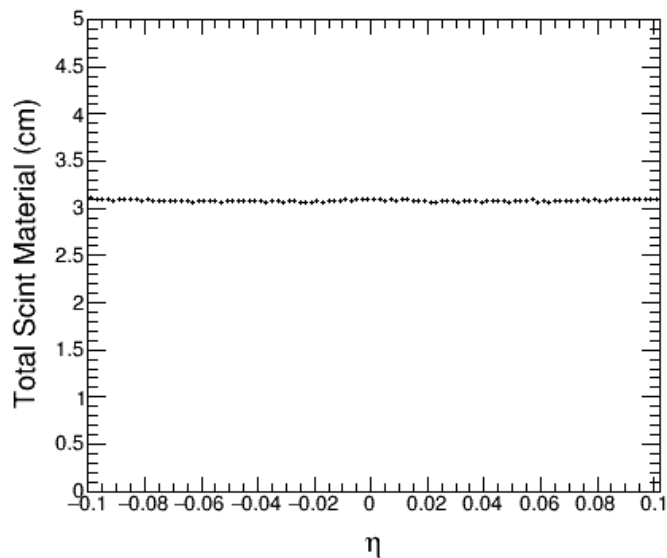
# Material Scan w/ GEANTINOS / Outer HCal

- Beam spot:  $|\phi| < 0.5$  deg. Centered at  $-5^\circ$ ,  $0^\circ$ , and  $5^\circ$

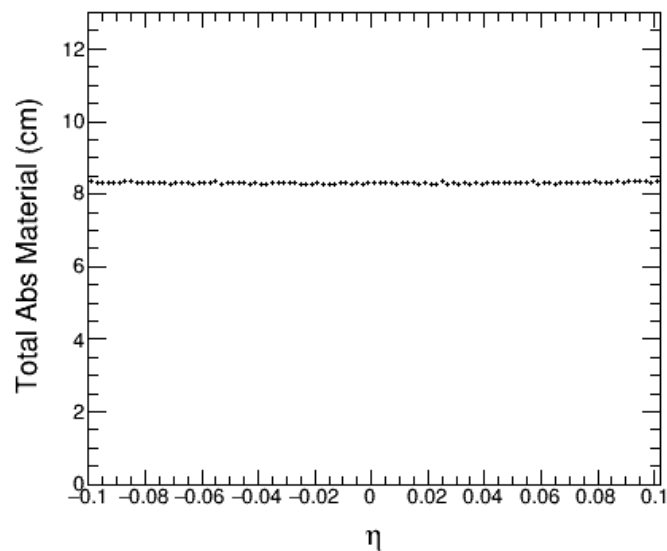


# Material Scan w/ GEANTINOS

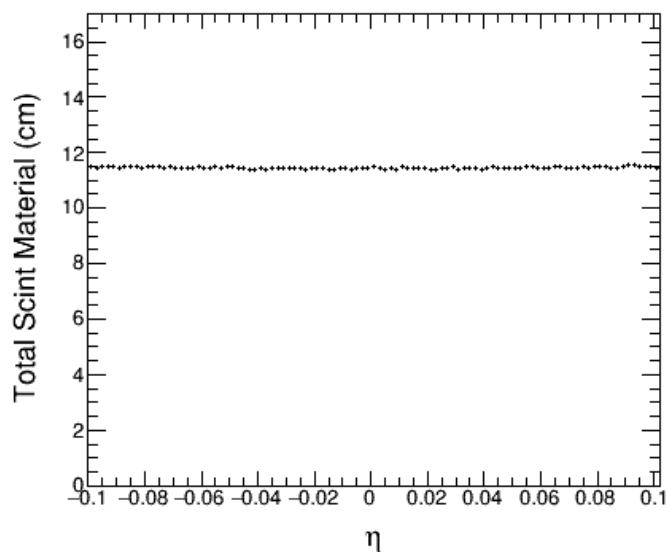
Mean H1 Total Scint Material



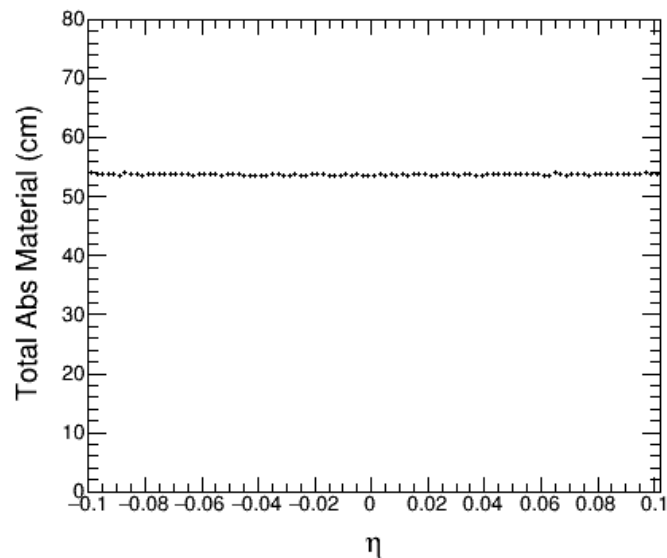
Mean H1 Total Abs Material



Mean H2 Total Scint Material



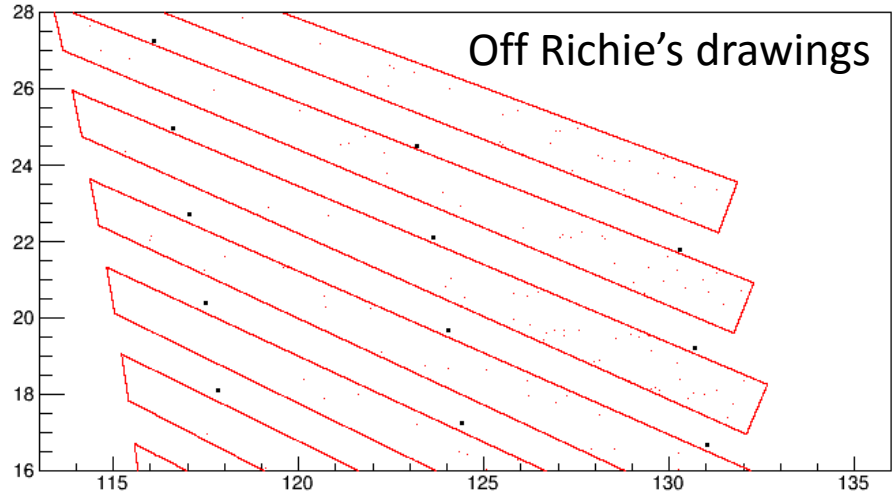
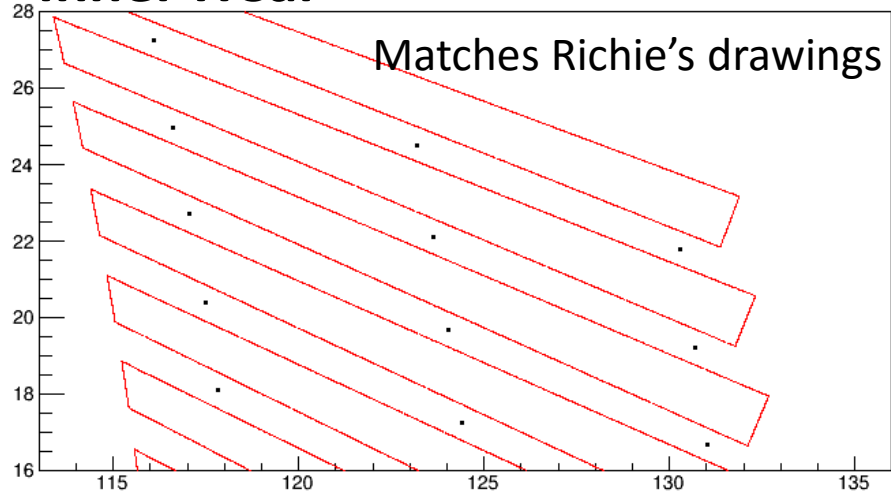
Mean H2 Total Abs Material



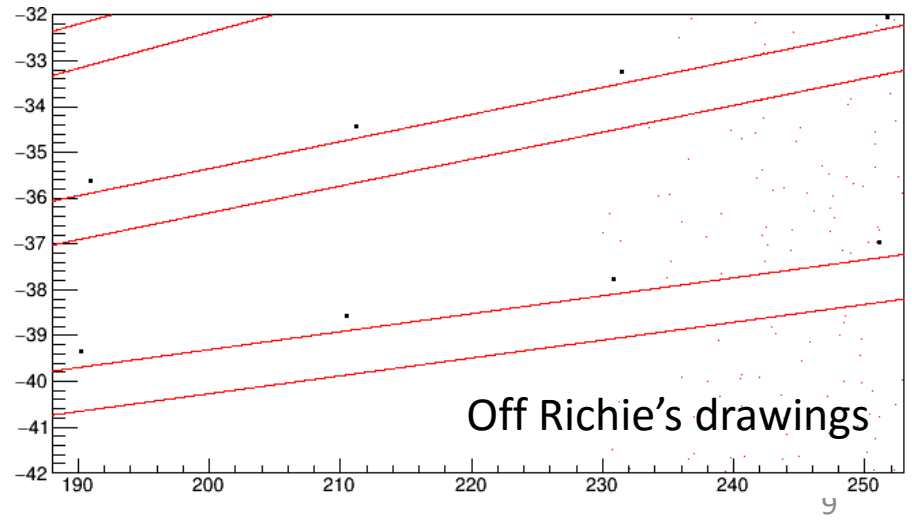
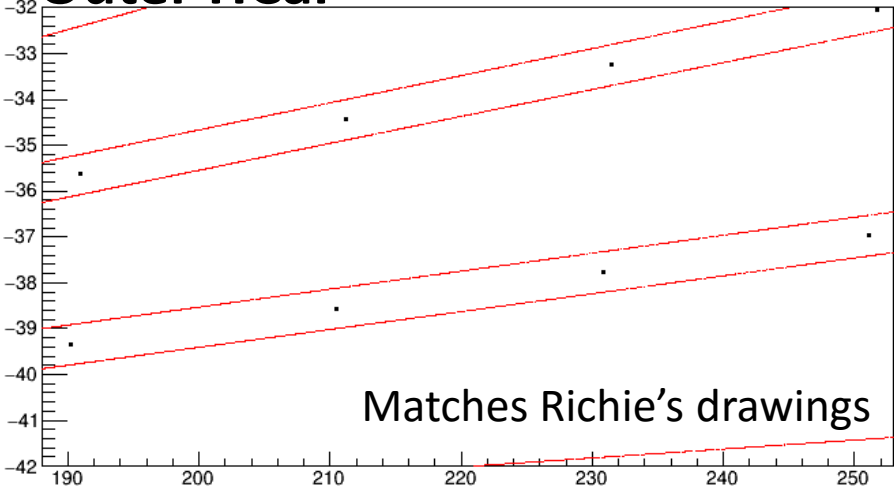


# What if the positions are off by several mm?

## Inner HCal



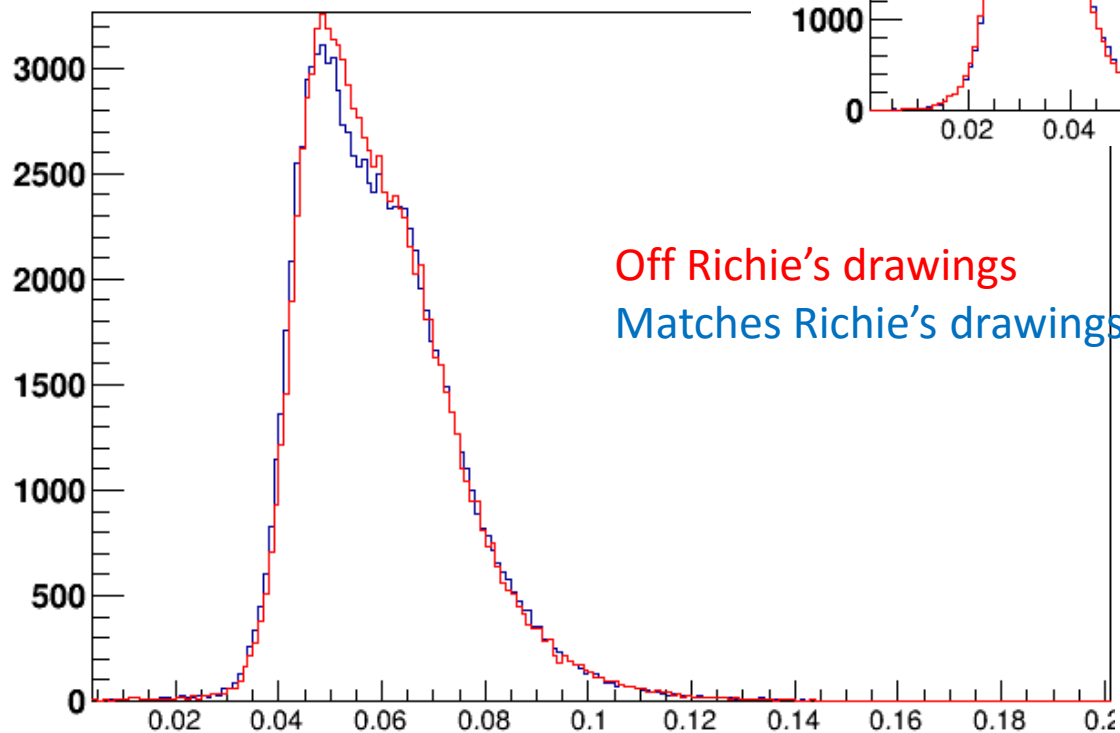
## Outer HCal



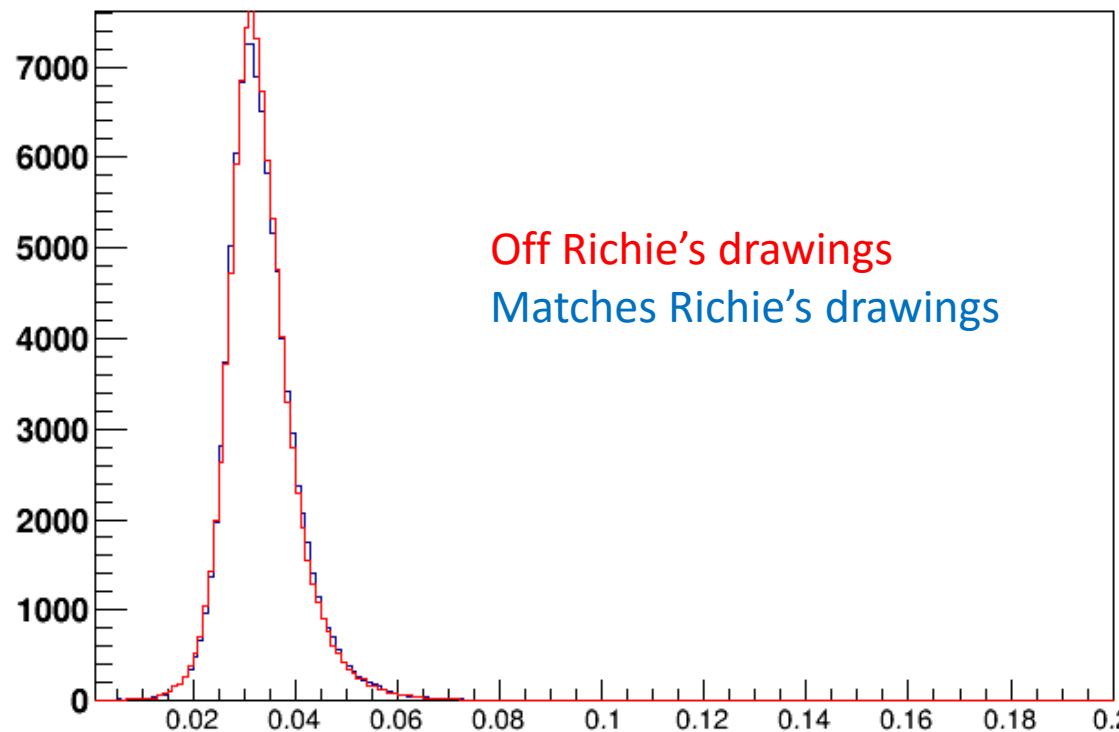
# Impact on sampling Fraction

10 GeV  $\mu^-$   
at  $|\eta| < 0.01$  &  $|\phi| < 0.5^\circ$

HCal Inner SF



HCal Outer SF



Off Richie's drawings  
Matches Richie's drawings

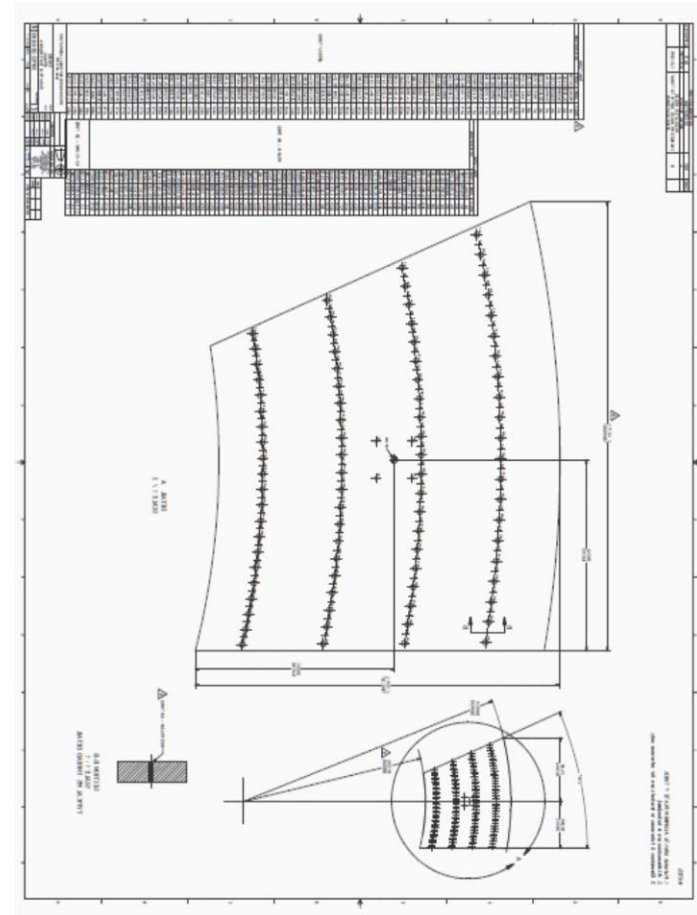
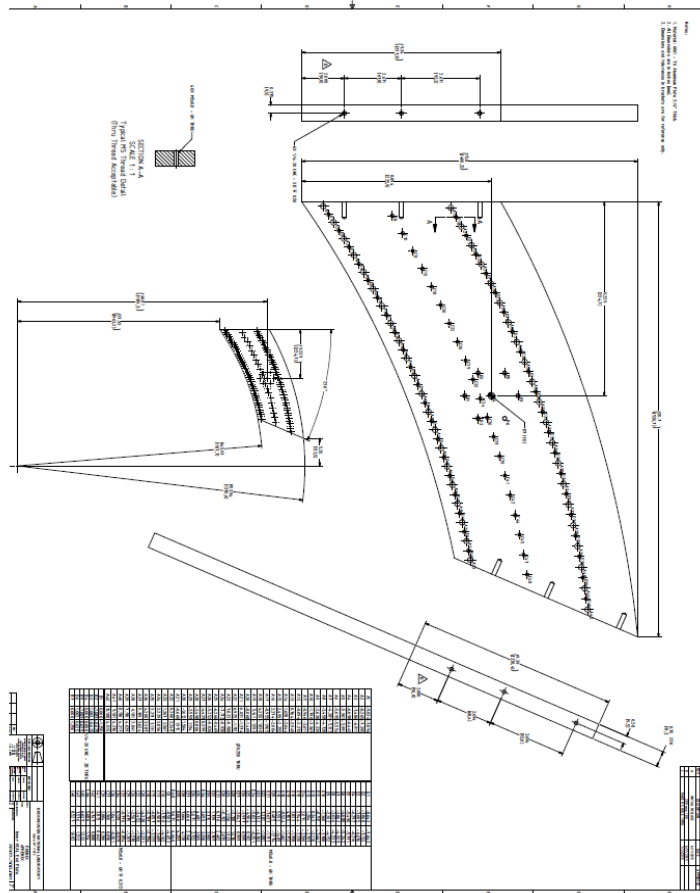
Off Richie's drawings  
Matches Richie's drawings

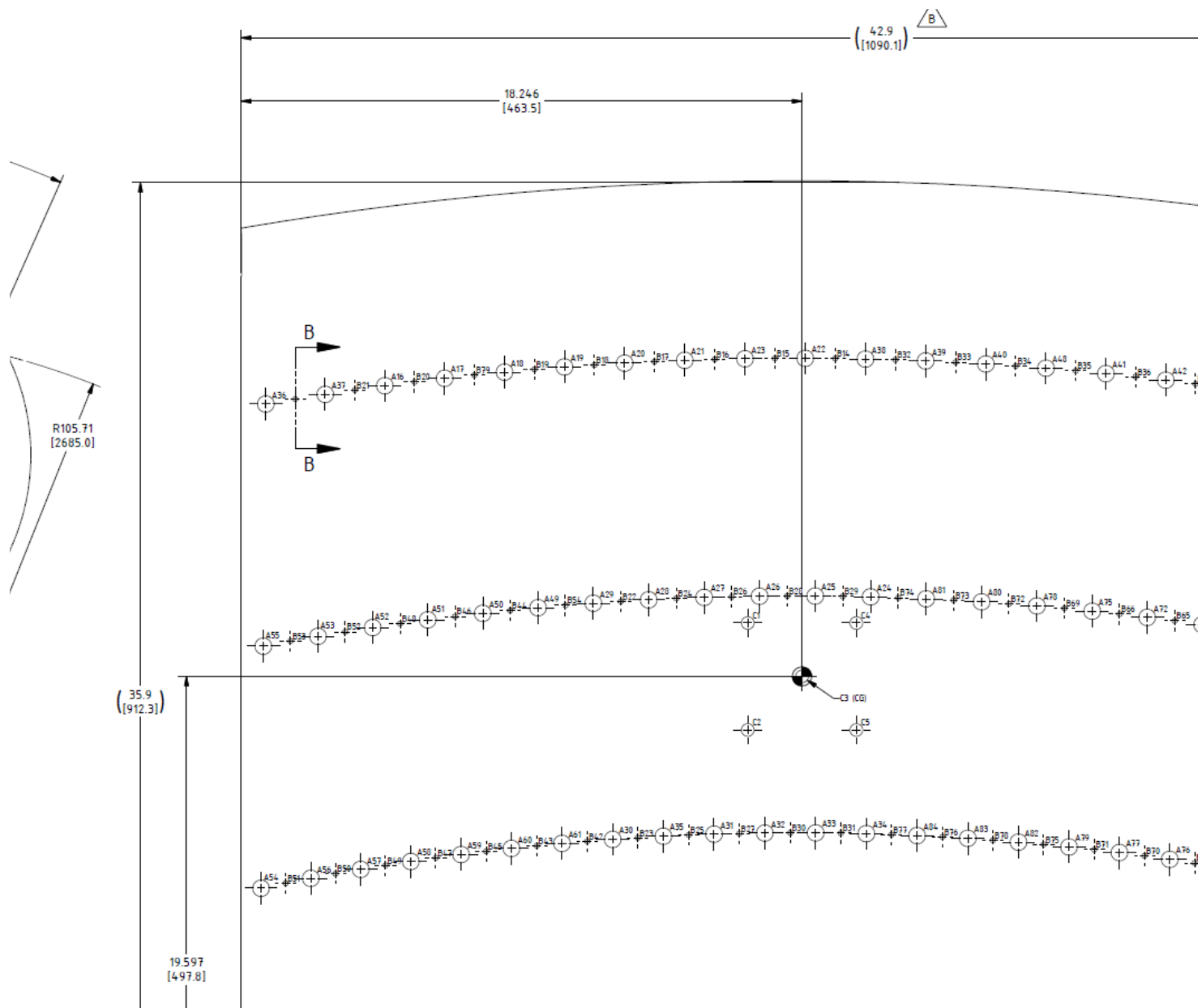
- Increasing the space by several mm doesn't impact the sampling fraction!

# Summary & To do

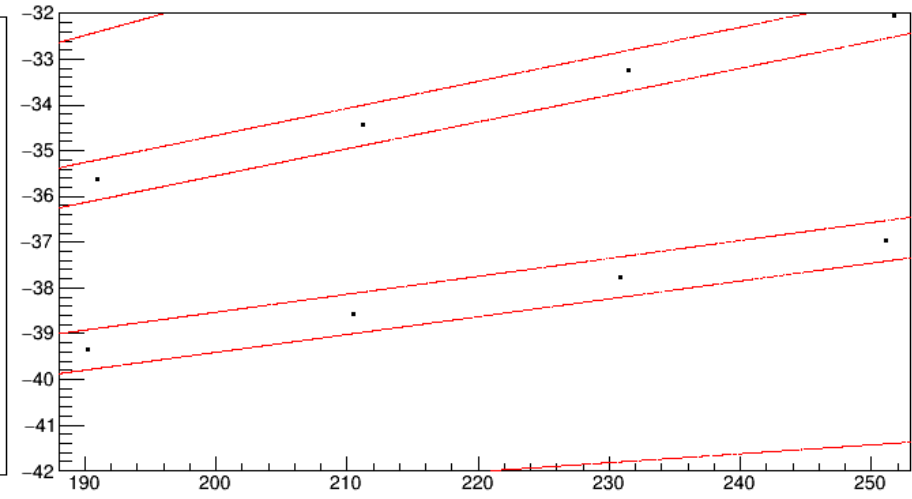
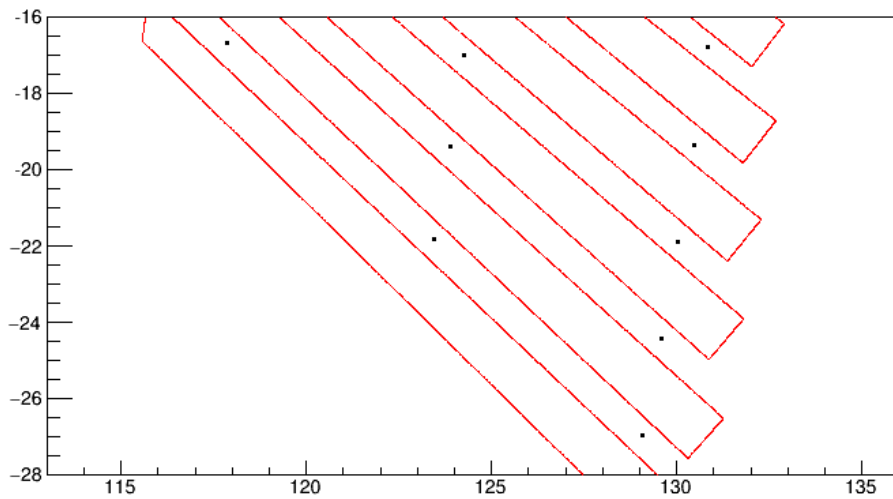
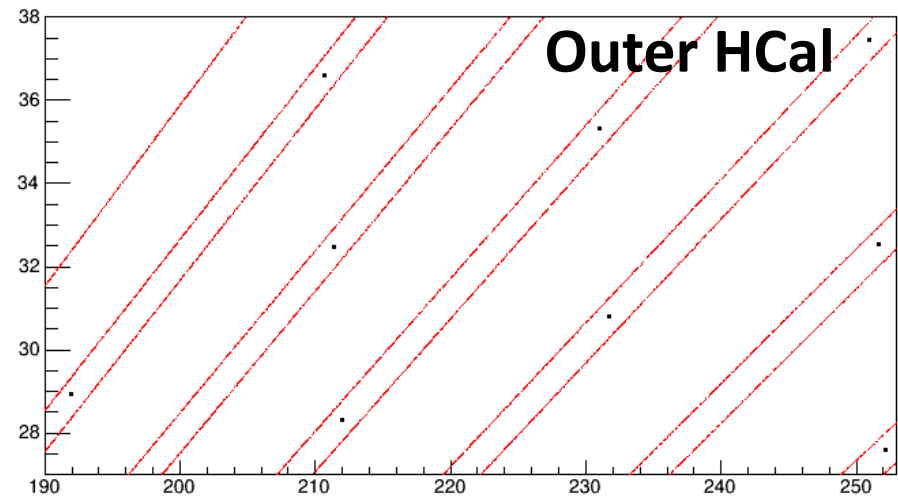
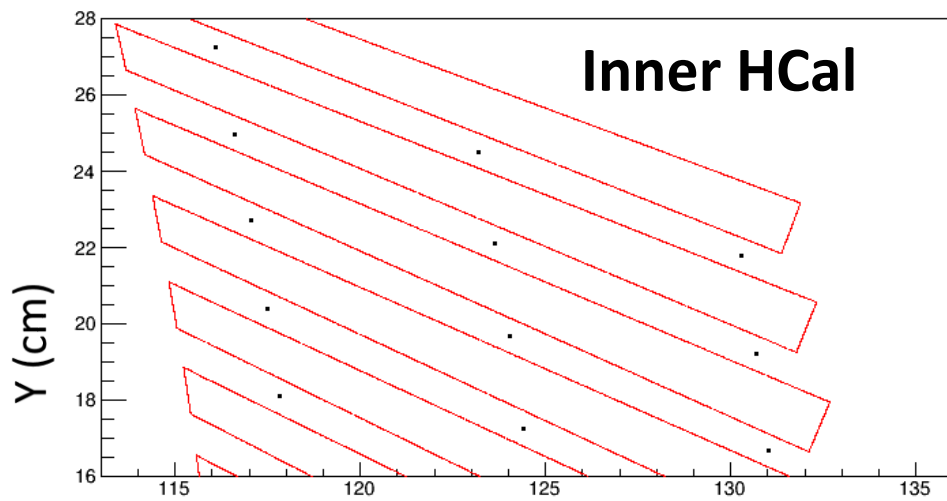
- Geometry describes the simulation very well?
- Carry out simulation studies similar to those done for prototype1

# Richie's Design Drawings





# GEANT4 Simulations



X (cm)

# GEANT4 Simulations

- Richie's  $y\%x$  points

